

## **SRINIVASA NAGA RAJA, M.D.**

*Department of Anesthesiology & Critical Care Medicine  
The Johns Hopkins University School of Medicine  
600 N. Wolfe St., Osler 292  
Baltimore, Maryland 21287, U.S.A.*

### **EMPLOYMENT:**

May 1997- present	Professor Department of Anesthesiology/Critical Care Medicine Division of Pain Medicine The Johns Hopkins University School of Medicine
May 1990-April 1997	Associate Professor Department of Anesthesiology/Critical Care Medicine The Johns Hopkins University School of Medicine
July 1981 - April 1990	Assistant Professor Department of Anesthesiology/Critical Care Medicine The Johns Hopkins University School of Medicine

### **TRAINING:**

<u>Name of Hospital</u>	<u>Location</u>	<u>Type of Service</u>	<u>Dates</u>	
			<u>From</u>	<u>To</u>
Univ. of Virginia School of Medicine	Charlottesville, Virginia	Postdoctoral Research Fellowship	1979	1981
Univ. of Washington Affiliated Hospitals	Seattle, Washington	Residency in Anesthesiology	1977	1979
Middlesex General Hospital	New Brunswick, New Jersey	Surgical Intern	1976	1977

### **DEGREES & DIPLOMAS:**

Bachelor of Medicine and Bachelor of Surgery (M.B., B.S.) Prince of Wales Medical College, Patna University, India, 1974

Diplomate of the American Board of Anesthesiology, 1982

Added Qualifications in Pain Management,  
The American Board of Anesthesiology, 1993, Recertified, 2003

### **RESEARCH TRAINING:**

July, 1979 to June, 1981 - Associated with Dr. P.G. Guyenet, Ph.D. in the Department of Pharmacology at the University of Virginia School of Medicine as a Research Training Fellow (N.I.G.M.S. Research Training Grant, University of Virginia School of Medicine). Conducted electrophysiological studies (evoked field potentials, single unit extracellular recordings in vivo and micro-iontophoretic experiments) to determine the mode of action of the drug of abuse, phencyclidine, in the CNS and compare it with the anesthetic ketamine.

### **PRESENT RESEARCH INTERESTS:**

Presently involved in studies on the pathophysiology of neuropathic pain and the pharmacology of sympathetically maintained pain (Reflex Sympathetic Dystrophy) in collaboration with Dr. James N. Campbell and Richard A. Meyer (Department of Neurosurgery, The Johns Hopkins University School of Medicine). These studies include clinical studies in patients with neuropathic pain as well as behavioral and neurophysiological studies in animal models of nerve injury. Principal investigator in the study that has led to the development of the "Phentolamine test" for the clinical diagnosis of sympathetically maintained pain states.

Other interests include the pharmacology of nociception, i.e., the modulation of responses of primary afferents by biogenic amines, peptides, and eicosanoids.

N.I.H. funded Clinical Trials on the "Treatment of Neuropathic Pain" using postherpetic neuralgia as a model.

N.I.H. funded Clinical Trials on the mechanisms and treatment of post-amputation pain states.

Investigation in animal models of the effects of complementary and alternative medicine in the management of cancer pain.

Studies on the influence of anesthetic techniques on perioperative outcome.

### **CLINICAL INTERESTS:**

Acute and Chronic Pain Management, especially neuropathic pain states such as sympathetically maintained pain, post herpetic neuralgia, and post-amputation pain. Use of regional anesthetic techniques for surgical and obstetric anesthesia.

### **HONORS:**

1972 - 1973    Patna University Merit Scholarship

1979 - 1981    National Research Service Award, National Institute of General Medical Sciences, at the University of Virginia.

1982 - 1983    Outstanding Teacher Award, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University.

1986	President, Neurosciences Division of the Association of Scientists of Indian Origin in America.
1987	Member (nominated) of the Association of University Anesthetists.
1989	Reviewer, Special Study Section, National Institute of Health.
1989-present	Reviewer for the following journals: Anesthesiology, Anesthesia and Analgesia, Neuroscience, Pain, Muscle and Nerve, Somatosensory and Motor Research, Archives of Ophthalmology, Journal of Clinical Anesthesia, The Clinical Journal of Pain, Journal of Neuroimmunology, and Molecular Brain Research.
1989	Ad-hoc Reviewer, Surgery, Anesthesiology and Trauma Study Section, National Institutes of Health.
1990 - 1994	Member, Surgery, Anesthesiology and Trauma Study Section, NIH.
1991-present	Associate Editor, Pain Digest.
1993-present	Reviewer, United States-Israel Binational Science Foundation Research Grants
1993-1997	Associate Editor, ANESTHESIOLOGY
1993- 1995	Member, Scientific Program Committee, American Pain Society
1994-present	Consultant, Anesthesia and Respiratory Devices Panel, Food & Drug Administration
1995	Chairman, Professional Development Courses, Annual Meeting of the American Pain Society, Los Angeles
1998- present	Editor, ANESTHESIOLOGY
1999-present	Associate Editor, PAIN
2000-present	Section Editor, "Classic Papers Revisited," ANESTHESIOLOGY
2000	Citation Poster Award, American Pain Society
2000	Member, Scientific Review Board, Center for Medicinal Cannabis Research
2001	Ad-hoc Reviewer, Surgery, Anesthesiology and Trauma Study Section, National Institutes of Health

- 2002 Ad-hoc Reviewer, Surgery, Integrative Functional and Cognitive Neuroscience Review Group, National Institutes of Health
- 2002 Clinical Trials Editor, MD Consult Pain Medicine
- 2002 Selected for *Marquis Who's Who in Medicine and Healthcare, 4<sup>th</sup> Edition*
- 2002 Co-Chair, Scientific Advisory Board, Reflex Sympathetic Dystrophy Syndrome Association (RSDSA)

**GRANTS:**

- 1982 - 1985 Co-Investigator; (Principal Investigator, James Campbell, M.D.): N.I.H. grant on Effects of Anesthetic on Primary Afferents.
- 1983 - 1986 Co-Investigator in a research project Neurophysiological and Psychophysical Studies of Pain, funded by the National Institute of Neurologic and Communicate Disorders and Stroke (Principal Investigator, James N. Campbell, M.D. NS20845), 20% effort.
- 1984 - 1987 Recipient of a New Investigator Research Award from the National Institute of General Medical Sciences, N.I.H.
- 1988 - 1995 Co-Investigator in a research project Neurophysiological and Psychophysical Studies of Pain, funded by the National Institute of Neurologic and Communicate Disorders and Stroke (Principal Investigator, James N. Campbell, M.D. NS20845).
- 1989 - 1992 Principal Investigator of a RO1 grant funded by the National Institute of Neurological and Communicative Disorders and Strokes, N.I.H. on Injury-Induced Pain: Chemical Modulation of Nociceptors, 25% effort.
- 1993 - 1996 Principal Investigator of a RO1 grant funded by the National Institute of Neurological and Communicative Disorders and Strokes, N.I.H. on Injury-Induced Pain: Chemical Modulation of Nociceptors, 25% effort
- 1993 - 1996 Co-Investigator; (Principal Investigator, Keith Lillemoe, M.D.): N.I.H. grant on Pain Relief in Pancreatic Cancer: A Randomized Trial.
- 1993 - 1996 Co-Investigator; (Principal Investigator, Stuart Grossman, M.D.): N.I.H. grant on Improved Dissemination of Cancer Pain Information.
- 1994 - 1999 Principal Investigator of Project 4 in a program project on Studies of Neuropathic Pain (Program Director, James N. Campbell, M.D.), NINCDS, 20% effort.

- 1996 - 1998 Co-Investigator, (Principal Investigator, Steve M. Frank, M.D.): IARS Clinical Scholar Research Award grant on Determinates of the Adrenergic and Metabolic Responses to Core Hypothermia.
- 1999 - 2000 Principal Investigator in U.S.A., United States-Israel Binational Science Foundation Grant, "Mechanisms of Neuropathic Pain Modulation by Diet"
- 2000 - 2005 Principal Investigator of RO1 grant, National Institute of Neurological and Communicative Disorders and Strokes, N.I.H., "Injury-Induced Pain: Chemical Modulation of Nociceptors," 25% effort.
- 1996 - 2001 Principal Investigator of Project 2 and co-investigator in Project 3 in a program project on "Pain Management in Persons with Disabilities" (Program Director, Barbara de Lateur, M.D.), National Center for Medical Rehabilitation Research, NIH, 20% effort.
- 2000-2005 Principal Investigator of Project 4: "Johns Hopkins Center for Cancer Complementary Medicine" (Program Director, Adrian Dobbs, M.D.)
- 2001-2006 Co-Investigator (Principal Investigator, Jennifer Haythornthwaite, Ph.D.) of R01 grant National Institute of Dental and Cranial Research, N.I.H.: "Pain Management in Temporomandibular Joint Disorders."
- 2002-2004 Principal Investigator of Janssen Extramural Research Grant: Efficacy of Transdermal Fentanyl for Chronic Neuropathic Pain."

#### **POST-DOCTORAL RESEARCH FELLOWS TRAINED:**

- 1987 - 1989 .....
- 1987 - 1989 .....
- 1989 - 1990 .....
- 1988 - 1991 .....
- 1993 - 1995 .....
- 1994 - 1996 .....
- 1995 - 1997 .....
- 1995 - 1996 .....
- 1996 - 1998 .....

1998 - 2000 .....

2000-2003 .....

2001-2003 .....

2000-2004 .....

Present .....

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During the last decade, an average of three Fellows per year have been trained in Pain Medicine, and several have continued in academic careers.

### **STATE LICENSES AND OTHER EXAMINATIONS:**

Licensed to practice Medicine in the State of Maryland - .....

E.C.F.M.G. examination, July 1975; F.L.E.X. examination, 1977

### **MEMBERSHIPS:**

American Pain Society

American Society of Anesthesiologists

Association of University Anesthesiologists

International Association for the Study of Pain

Society for Neuroscience

Amputee Coalition of America

Reflex Sympathetic Dystrophy Association of America

### **ADMINISTRATIVE POSITIONS:**

Director of Pain Research, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, 1998-present

Member, Grant Review Committee, Blaustein Pain Center, Johns Hopkins Hospital, 1997-present

Director, Division of Pain Medicine, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University School of Medicine, 1993-94

Co-Director, Pain Management Services, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University School of Medicine, 1991-93

Member, Scientific Program Committee, Annual Meeting of American Pain Society, 1989, 1990 & 1994

Chairman, Clinical Research Committee, Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins University School of Medicine, 1990-92

Member, Clinical Competence Committee, Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University School of Medicine, 1993-present

Member, Anesthesia Pharmacy Advisory Committee, Johns Hopkins School of Medicine, 1985-89

Member, Department of Anesthesiology and Critical Care Medicine, Promotions Committee, The Johns Hopkins University School of Medicine, 1997-present

Member, Admissions Committee, The Johns Hopkins School of Medicine, 2000-present

Scientific Chair, International Update on Reflex Sympathectomy Dystrophy, sponsored by Reflex Sympathetic Dystrophy Association, Tampa, 2002

National Initiative on Pain Control (NIPC), Scientific Advisory Board, 2002-present

### **INVITED LECTURES: LOCAL, NATIONAL AND INTERNATIONAL**

Invited speaker at St. Joseph's Hospital, Baltimore, "Pediatric Anesthesia Circuits," 1987.

Speaker at a panel on Reflex Sympathetic Dystrophy at the Joint Meeting of the American and Canadian Pain Society, Toronto, November 1988.

Invited speaker at St. Agnes Hospital, Baltimore, "Anesthesia Equipment and Anesthetic Mishaps," August 1989.

Invited speaker, symposium on "Sympathetically Maintained Pain," 6th World Congress on Pain, Adelaide, Australia, April 1990.

Invited speaker, symposium on Animal Pain and Its Control, Cornell University, New York; "Role of peripheral alpha-adrenergic receptors in chronic pain," June 1990.

Invited speaker at the Update and Advances in Pain Management, University of Texas Health Science Center at Houston, "Update on basic research on pain mechanisms," Houston, September 1990.

Invited Speaker, Conference on Sympathetically Maintained Pain, Mensana Clinic, "Diagnosis of Sympathetic Maintained Pain," Baltimore, April 1991.

Invited speaker, Anesthesiology Grand Rounds, St. Joseph's Hospital, Baltimore, MD, "Recent Advances in Pain Management," November 1991.

Invited speaker, Annual Meeting of the American Society for Regional Anesthesia, Tampa, March 1992

Invited speaker, Second International Pain Symposium, Atlanta, April 1992

Invited speaker, University of Tsukuba, Japan, August 1992.

Panel member, Chronic Pain Management: Current Clinical Issues. Annual meeting of the American Society of Anesthesiologists, New Orleans, October, 1992.

Invited speaker, Neuropathic Pain: Basic mechanisms In  $\alpha_2$  Adrenergic Mechanisms in Spinal Analgesia, Lucerne, Switzerland, August 1993.

Panel member, Chronic Pain Management. Annual meeting of the American Society of Anesthesiologists, Washington, DC, October 1993.

Panel member, Drug Infusions and Nerve Blocks in Pain Diagnosis at the Annual meeting of the American Pain Society, Florida, November 1993

Invited speaker, The Pain & Rehabilitation Clinic of Chicago and Department of Physical Medicine and Rehabilitation of Northwestern University Medical School, Chicago, Illinois, "Pathophysiology of RSD: Advances in the Last 5 Years With Emphasis on Peripheral and Central Mechanisms," January 1994.

Invited speaker, 6th International Congress Pain Clinic, "Chronic Pain: Pathophysiology and Rationale for Treatment," Atlanta, April 1994

Invited speaker, Paulo Symposium on Modern Trends in Postoperative Pain Control, Hanasaari, Finland, September 1994

Panel speaker, Clonidine in the Treatment of Neuropathic Pain/Reflex Sympathetic Dystrophy. Annual meeting of the American Pain Society, Florida 1994

Invited speaker, Satellite Symposium to the Association of University Anesthetists meeting, "The afferent message in man," May 1995

Panel chair, "Pain Therapies Based on Mechanisms of Hyperalgesia and Antinociception," Annual Meeting of American Pain Society, Los Angeles, November 1995



Panel member, Symposia on "Diagnostic Techniques for Sympathetically Maintained Pain," Annual Meeting of American Pain Society, Los Angeles, November 1995

Invited speaker, "Comprehensive Review of Pain Management," American Pain Society for Regional Anesthesia, New Orleans, November 1995

Invited speaker, "Current Concepts in Acute, Chronic, and Cancer Pain Management," The World Foundation for Pain Relief and Research Inc., New York, December 1995

Invited speaker, "Diagnosis and Treatment of Reflex Sympathetic Dystrophy," Annual Meeting of the American Society for Regional Anesthesia, San Diego, March 1996

Panel member, Symposia on "Monoamines in Pain Modulation," International Association for Study of Pain, 8th World Congress of Pain, Vancouver, August 1996

Chairperson, Panel on "Catecholamines and Pain," 8th International Congress on Catecholamines, Asilomar, September 1996.

Panel speaker, "Neuropathic Pain: Diagnosis and Management," Second Annual Multidisciplinary Pain Medicine Update, Baltimore, September 1996.

Invited speaker, "Reflex Sympathetic Dystrophy," International Seminar on Pain, Santiago, Chile, October 1996.

Panel Member, "Diagnosis of Sympathetically Maintained Pain," Annual Meeting of American Pain Society, Washington, DC, November 1996.

Speaker, "Postherpetic Neuralgia," The Johns Hopkins School of Medicine Biennial Meeting, June 1997.

Invited speaker, Meeting of the Tamil Nadu Chapter of the Indian Association of Anesthesiologists, Madras, India, August 1997.

Invited speaker, Professional Development Course, "Role of Sympathetic Blocks in the Diagnosis and Management of Somatic and Visceral Pain States," Annual Meeting of the American Pain Society, New Orleans, October 1997.

Grand Rounds speaker, "Neuropathic Pain: Rational Basis for Therapy," Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins Medical Institutions, December 1997.

Invited speaker, "Current Concepts in the Diagnosis and Treatment of Sympathetically Maintained Pain," Postgraduate Course: Current Concepts in Acute, Chronic and Cancer Pain Management, World Foundation for Pain Relief and Research, New York City, December, 1997.

Invited speaker, "Clinical Trials on Neuropathic Pain," Blaustein Conference, The Johns Hopkins Medical Institutions, January 1998.

Invited speaker, "Complex Regional Pain Syndromes" and "Postamputation Pain Syndromes," 7<sup>th</sup> John J. Bonica Vail Winter Pain Conference, Vail, Colorado, March, 1998

Invited speaker, 1<sup>st</sup> International Conference on Mechanisms and Treatment of Neuropathic Pain, Rochester, N.Y., June 1998

Invited speaker, "Complex Regional Pain Syndromes," 4<sup>th</sup> Annual Pain Update Mtg., Rochester, N.Y., August 1998

Invited speaker, Annual Meeting of the American Pain Society, San Diego, CA, November, 1998

Grand Rounds speaker, "Opioids for Chronic Noncancer Pain?" Department of Anesthesiology and Critical Care Medicine, The Johns Hopkins Medical Institutions, February 1999

Invited speaker, "Complex Regional Pain Syndromes: Changing Concepts and Puzzling Pathophysiology," San Diego County Society of Anesthesiologists, March 1999

Invited speaker, "Alternatives in Pain Management," Howard County General Hospital, Columbia, Maryland, April 1999

Invited speaker, "Nerve Block Controversies," 2<sup>nd</sup> International Conference on Mechanisms and Treatment of Neuropathic Pain, Washington, D.C., June 1999

Invited speaker, "Pharmacological dissection of neuropathic pain: Intravenous infusions as diagnostic and therapeutic tools," 9<sup>th</sup> World Congress on Pain, Vienna, Austria, August 1999.

Invited speaker, "Pain Management - Guidelines for Gastroenterologists" 5<sup>th</sup> Annual Johns Hopkins Hepato-Biliary Update Mtg., Ocean City, MD, September 1999.

Panel speaker, "Common Fatal Flaws" - Panel on "Perils of Publishing or What Do Those Editors Want, Anyway?" American Society of Anesthesiologists Annual Mtg, Dallas, TX, October 1999.

Invited speaker, "CRPS Type I & II: Current Trends," Asian and Oceanic Society of Regional Anaesthesia. 5<sup>th</sup> Biennial Congress, New Delhi, India, October 1999.

Invited speaker, "Peripheral Neural Mechanisms of Somatic Pain," Asian and Oceanic Society of Regional Anaesthesia. 5<sup>th</sup> Biennial Congress, New Delhi, India, October 1999.

Faculty participant, “Paravertebral Lumbar Sympathetic Plexus Block,” Workshop on Regional Anesthesia Techniques, Asian and Oceanic Society of Regional Anaesthesia. 5<sup>th</sup> Biennial Congress, New Delhi, India, October 1999.

Invited speaker, “Current concepts in diagnosis and diagnostic tools for complex regional pain syndrome,” World Foundation for Pain Relief and Research, New York, December 1999.

Invited speaker, “State of the art cancer pain management,” First Annual Pain Management Symposium, Columbia University College of Physicians & Surgeons, New York, April 2000

Invited speaker, “Opioids and chronic pain: Two centuries of controversies,” Blaustein Lecture Series, University of Maryland School of Medicine, Baltimore, MD, May 2000.

Invited speaker, “Role of opioids in pain management: Two centuries of controversies and concerns,” Purdue Pharma LP, Norwalk, CT, August 2000.

Invited speaker, “Opioids for chronic pain: What is the controversy?” St. Joseph Medical Center, Towson, Maryland, August 2000.

Invited speaker, “Sympathetic Blocks,” Sixth Annual Multidisciplinary Pain Medicine and Regional Anesthesia Update, Baltimore, MD, August 2000

Moderator, “Phantom pain after amputation: A perceptual correlate of thalamic and cortical reorganization,” American Pain Society Annual Meeting, Atlanta, November 2000.

Invited speaker, “Pain management,” Kernan Hospital, Amputee Support Group, Baltimore, MD, December 2000.

Invited participant, Symposium: Pain Management for the New Millenium - Challenges and Solutions, Albert Einstein Medical Center, Philadelphia, PA, January 2001.

Invited speaker, Symposium: Ageing and anaesthesia: “Anaesthetic management of the elderly,” European Society of Anaesthesiologists, Gothenburg, Sweden, April 2001.

Panel speaker: Peripheral Nerve Blocks, American Society of Anesthesiologists, Annual Meeting, New Orleans, October 2001.

Guest Lecture, “Design of Clinical Studies and Drug Trials,” Stanley Medical College, India, November 2001.

Invited participant, Workshop: Reflex sympathetic dystrophy/complex regional pain syndrome (CRPS): state-of-the-art-science, National Institutes of Health, Bethesda, December 2001.

Invited speaker, International Update on RSD/CRPS, “Guidelines for Therapy: Research Outcomes vs Expert Opinions,” Tampa, Florida, February 2002.

Invited speaker, American Pain Society Symposium, “Evidence for Alternative Therapies for Pain from Arthritis and Related Diseases,” Baltimore, Maryland, March 2002.

Invited speaker, American Pain Society Meeting, “Grand Rounds for the Basic Scientist: Live Case Presentations of Patients with Chronic Pain,” Baltimore, Maryland, March 2002.

Invited speaker, Southern Pain Conference, “Complex Regional Pain Syndromes: Refining Diagnostic Criteria and Defining Therapeutic Goals,” Lexington, Kentucky, April 2002.

Invited speaker, Danish Pain Research Seminar, “Pharmacological strategies towards the sympathetic nervous system,” Hindsgavl Slot, Denmark, June 2002.

Invited speaker, IASP Symposium, “Sympathetically Maintained Pain,” San Diego, California, August 2002.

Invited speaker, Neurology Grand Rounds, “Postherpetic Neuralgia: Clinical Trials and Tribulations,” The Johns Hopkins University, Baltimore, Maryland 2002.

Invited speaker, 5<sup>th</sup> International Conference Mechanisms and Treatment of Neuropathic Pain, “Opioid Analgesics,” Bermuda, November 2002.

Invited speaker, The American Geriatrics Society Annual Scientific Meeting, Baltimore, Maryland, “Additional therapies for postherpetic neuralgia: opioid analgesics and interventional strategies,” May 2003.

Invited speaker, JHUSOM 9<sup>th</sup> Annual Multidisciplinary Pain Medicine Update Meeting, and 7<sup>th</sup> Annual American Neuromodulation Society Meeting, “Efficacy of Opioids in Pain Management,” “Neuropathic Pain & CRPS,” Orlando, May 2003

Invited speaker, Johns Hopkins University, Blaustein Lecture, “Case Presentation of a Patient with Neuropathic Pain After an Upper Extremity Traumatic Amputation,” Baltimore, June 2003.

Invited speaker, 6<sup>th</sup> International Conference Mechanisms and Treatment of Neuropathic Pain, “Antidepressants and neuropathic pain,” Bermuda, November 2003.

Invited speaker, JHUSOM 10<sup>th</sup> Annual Multidisciplinary Pain Medicine Update Meeting, and American Pain Medicine Meeting, “Neuropathic Pain,” “Sympathetic Blocks,” Baltimore, August 2004

Co-director and speaker, International update on RSD/CRPS, “CRPS: clinical presentations & diagnostic workshops,” San Diego, September 2004.

Invited speaker, 7<sup>th</sup> International Conference Mechanisms and Treatment of Neuropathic Pain, "Pharmacologic treatments for neuropathic pain and their implications for understanding mechanisms," Bermuda, November 2004.

Invited speaker, Clinical Education Series, Pennsylvania Academy of Family Physicians, "Reflex sympathetic dystrophy (CRPS) - current concepts in diagnosis and management," Hershey, November 2004.

### **VISITING PROFESSORSHIPS:**

Visiting Professor at the University of Pennsylvania, "Sympathetically Maintained Pain," February 1989.

Visiting Professor at the University of Virginia, Charlottesville, "Peripheral Mechanisms of Pain: Recent Advances," April 1989.

Visiting Professor, University of Texas Health Sciences Center at Houston, "Peripheral and Spinal Modulation of Pain," September 1989.

Visiting Professor, Department of Anesthesia, The Bowman Gray School of Medicine, "Preemptive Analgesia - Is an ounce of prevention worth a pound of care," March 1993.

Visiting Professor, Hvidovre Hospital, University of Copenhagen, Denmark, "Pain and the Sympathetic Nervous System," August 1993.

Visiting Professor, Jawaharlal Institute of Postgraduate Medical Education and Research, Pondicherry, India, "Management of Cancer Pain," August 1994.

Visiting Professor, Department of Clinical Neurophysiology, Huddinge University Hospital, Karolinska Institute, Huddinge, Sweden, "Studies in an Animal Model of Neuropathic Pain," September 1994.

Visiting Professor, University Hospital Uppsala, Sweden, "Pathophysiology of Sympathetically Maintained Pain," September 1994.

Visiting Professor, Orebrö Medical Center, Orebrö, Sweden, "General vs. Regional Anesthesia for Radical Prostatectomy: Pros and Cons," September 1994.

Visiting Professor, Department of Anesthesiology, Massachusetts General Hospital, "Is Chronic Pain Acute Pain that Persists," April 1995.

Visiting Professor, New York Hospital, Cornell Medical Center, "Current Concepts in the Pathophysiology of Acute and Chronic Pain," May 1995

Visiting Professor, Vanderbilt University, "Is Chronic Pain Acute Pain that Persists," April 1996.

Visiting Professor, Southwestern Medical Center at Dallas, The University of Texas, "Neuropathic Pain," February 1997.

Visiting Professor, Department of Anaesthesia, National University of Singapore, "Neuropathic Pain and Its Treatment," August 1997.

Visiting Professor, Department of Anesthesiology, Sri Ramachandra Medical College and Research Institute, Madras, India "Complex Regional Pain Syndrome," August 1997.

Visiting Professor, Hadassah University, Israel, May 1998.

Visiting Professor, Benjamin Franklin Medical Center, Freie Universität Berlin, Germany, "Value of Nerve Blocks and Infusion Tests in the Diagnosis of Chronic Pain," October 1998.

Visiting Professor, Department of Anesthesiology, University of California, San Diego, "Chronic Pain: Is it Acute Pain that Persists?" and "Herpes Zoster Infections and Its Sequelae," March 1999.

Visiting Professor, Department of Anesthesiology, Columbia University, New York, NY, "Mechanisms of Neuropathic Pain: Lessons from Transgenic Mice," December 1999.

Distinguished Visiting Professor, Department of Anesthesiology, Mayo Clinic, Rochester, Minnesota "Poppies and Pain: A Tale of Two Centuries," February 2002.

Visiting Professor, Department of Anesthesiology, Duke University School of Medicine, Durham, North Carolina, "Poppies and Pain: A Tale of Two Centuries," April 2002.

Visiting Professor, Department of Anesthesiology, Duke University Medical Center, Genetics of Pain Series, Durham, North Carolina, "The Yin and Yang of Pain: Altered Central Modulation in Neuropathic Pain," February 2003.

Visiting Professor, New York Neurological Institute, Department of Neurology, Columbia University, New York, NY, Post-herpetic Neuralgia: Controversies Over the Role of Opioids," June 18, 2003

#### **PUBLICATIONS (in peer-reviewed journals):**

1. Raja, S.N., Guyenet, P.G. **The effects of phencyclidine on the spontaneous activity of mono-aminergic neurons.** European Journal of Pharmacology. 63:229-233, 1980.
2. Raja, S.N., Guyenet, P.G.: **Action of phencyclidine on synaptic transmission in the hippocampus.** Brain Research. 236:289-304, 1982.

3. Raja, S.N., Moscicki, M.S., Woodside, J.R., DiFazio, C.A. **The effect of acute phencyclidine administration on cyclopropane requirement (MAC) in rats.** Anesthesiology. 56:275-279, 1982.
4. Raja, S.N., Meyer, R.A., Campbell, J.N., Burke, R. **The response of nociceptive afferents in the peripheral nerve to cutaneous heat stimuli is altered by general anesthetics.** Anesthesia and Analgesia 62:279-280, 1983.
5. Campbell, J.N., Raja, S.N., Meyer, R.A. **Halothane sensitizes cutaneous nociceptors in monkey.** Journal of Neurophysiology. 52:762-770, 1984.
6. Raja, S.N., Campbell, J.N., Meyer, R. A. **Evidence for different mechanisms of primary and secondary hyperalgesia following heat injury to the glabrous skin.** Brain. 107:1179-1188, 1984.
7. Meyer, R.A., Raja, S.N., Campbell, J.N. **Coupling of action potential activity between unmyelinated fibers in the peripheral nerve of monkey.** Science. 227:184-187, 1985.
8. Meyer, R.A., Raja, S.N., Campbell, J.N., Mackinnon, S.E., Dellon, A. L. **Neural activity originating from a neuroma in the baboon.** Brain Research. 325:255-260, 1985.
9. Meyer, R.A., Campbell J.N., Raja, S.N. **Peripheral neural mechanisms of cutaneous hyperalgesia**, in: Advances in Pain Research and Therapy, Vol. 9 (Proceedings of the IV World Congress on Pain), H. L. Fields, R. Dubner and F. Cervero (eds.), Raven Press, New York, 1985, pp. 53-72.
10. Raja, S.N., Geller, H. **Another potential source of major gas leak.** Anesthesiology. 64:297-298, 1986.
11. Raja, S.N., Meyer, R.A., Campbell, J.N., Khan, A.A. **Narcotics do not alter the heat response of unmyelinated primary afferents in monkey.** Anesthesiology. 65:468-473, 1986.
12. Raja, S.N., Meyer, R.A., and Campbell, J.N. **Peripheral mechanisms of somatic pain.** Anesthesiology. 68:571-590, 1988.
13. Meyer, R.A., Campbell, J.N., Raja, S.N. **Antidromic nerve stimulation in monkey does not sensitize unmyelinated nociceptors to heat.** Brain Research. 441:168-172, 1988.
14. Campbell, J.N., Raja, S.N., Meyer, R.A., MacKinnon, S.E. **Myelinated afferents signal the hyperalgesia associated with nerve injury.** Pain. 32:89-94, 1988.
15. Frost, S.A., Raja, S.N., Campbell, J.N., Meyer, R.A., Khan, A.A. **Does hyperalgesia to cold stimuli characterize patients with sympathetically maintained pain (Reflex Sympathetic Dystrophy)?**, in: R. Dubner, G.S. Gebhart, M.R. Bond, (eds.), Pain

Research and Clinical Management, Vol. 3 (Proceedings of the Vth World Congress on Pain), Elsevier Science Publishers, Amsterdam, (1988), pp. 151-156.

16. Campbell, J.N., Khan, A.A., Meyer, R.A., Raja, S.N. **Responses to heat of C-fiber nociceptors in monkey are altered by injury in the receptive field but not by adjacent injury.** Pain. 32:327-332, 1988.
17. Campbell, J.N., Raja, S.N., and Meyer, R.A. **Painful sequelae of nerve injury**, in: R. Dubner, G.S. Gebhart, and M.R. Bond (eds.), Pain Research and Clinical Management, vol. 3, Proceedings of the Vth World Congress on Pain, Amsterdam, Elsevier Science Publishers, (1988), pp. 135-143.
18. Berkowitz, I.D., Raja, S.N., Bender, K.S. and Kopits, S.E. **Dwarfs: Pathophysiology and anesthetic implications.** Anesthesiology, 73:739-759, 1990.
19. Raja, S.N. **The management of pain**, Second Edition by John J. Bonica -- a book review. Anesthesiology 73:1298, 1990.
20. Raja, S.N., Treede, R.-D., Davis, K.D., Campbell, J.N. **Systemic alpha-adrenergic blockade with phentolamine: A diagnostic test for sympathetically maintained pain.** Anesthesiology, 74(4):691-698, 1991.
21. Treede, R.-D., Raja, S.N., Davis, K.D., Meyer, R.A., and Campbell, J.N. **Evidence that peripheral alpha-adrenergic receptors mediate sympathetically maintained pain**, in: Proceedings VIth World Congress On Pain, M. R. Bond, J. E. Charlton, and C. J. Woolf (eds.), Elsevier Science Publishers, (1991) pp 377-382.
22. Manning, D.C., Raja, S.N., Meyer, R.A., and Campbell, J.N. **Pain and hyperalgesia following intradermal injection of bradykinin in humans.** Clinical Pharmacology and Therapeutics, 50:721-729, 1991.
23. Davis, K.D., Treede, R.-D., Raja, S.N., Meyer, R.A., and Campbell, J.N. **Topical application of clonidine relieves hyperalgesia in patients with sympathetically maintained pain.** Pain, 47:309-318, 1991.
24. Raja, S.N., Davis, K.D., and Campbell, J.N. **The adrenergic pharmacology of sympathetically maintained pain.** J. of Reconstructive Microsurgery, 8:63-69, 1992.
25. Valley, M.A. and Raja, S.N. **Relief of intractable pain from metastatic multiple myeloma using epidural phenol injections.** Journal of Pain and Symptom Management, 7:179-181, 1992.
26. Khan, A.A., Raja, S.N., Manning, D.C., Campbell, J.N., and Meyer, R.A. **The Effects of bradykinin and sequence-related analogs on the response properties of nociceptors.** Somatosensory and Motor Research, 9:97-106, 1992.



27. Treede, R.-D., Meyer, R.A., Raja, S.N., and Campbell, J.N. **Peripheral and central mechanisms of cutaneous hyperalgesia.** Progress in Neurobiology, 38:397-421, 1992.
28. Campbell, J.N., Meyer, R.A., Raja, S.N. **Is nociceptor activation by alpha-1 adrenoreceptors the culprit in sympathetically maintained pain?** American Pain Society Journal, 1:3-11, 1992
29. Raja, S.N. and Veloso, K. **Practical management of pain**, Second Edition by Prithvi Raj - a book review. Anesthesiology 76:871, 1992.
30. Meyer R.A., Treede R.-D., Raja, S.N., Campbell, J.N. **Peripheral versus central mechanisms for secondary hyperalgesia: Is the controversy resolved?**, American Pain Society Journal, 1(2):127-131, 1992.
31. Treede, R.-D., Davis, K.D., Campbell, J.N., Raja, S.N. **The plasticity of cutaneous hyperalgesia during sympathetic ganglion blockade in patients with neuropathic pain.** Brain 115:607-621, 1992.
32. Meyer, R.A., Davis, K.D., Raja, S.N., Campbell, J.N. **Sympathectomy does not abolish bradykinin-induced cutaneous hyperalgesia in man.** Pain, 51:323-327, 1992.
33. Raja, S.N., Campbell J.N., Meyer, R.A., Colman R.W. **Role of kinins in pain and hyperalgesia: psychophysical studies in a patient with kininogen deficiency.** Clinical Science 83:337-341, 1992.
34. Raja, S.N., Dickstein, R.E., Johnson, C.A. **Comparison of postoperative analgesic effects of intraarticular bupivacaine and morphine following arthroscopic knee surgery.** Anesthesiology, 77:1143-1147, 1992.
35. Raja, S.N. **Reflex sympathetic dystrophy: pathophysiological basis for therapy.** Pain Digest, 2:274-280, 1992.
36. Valley, M.A., Bourke D.L., Hamill, M.P., Raja, S.N. **Time course of sympathetic blockade during epidural anesthesia: laser doppler flowmetry studies of regional skin perfusion.** Anesthesia and Analgesia, 76:289-294 1993.
37. Valley, M.A., Bourke, D.L., McKenzie A.M., Raja, S.N. **Quantitative testing of sympathetic function with laser doppler flowmetry.** Journal of Clinical Monitoring 9(4): 252-256, 1993.
38. Shir, Y., Cameron, L.B., Raja, S.N., Bourke, D.L. **The safety of intravenous phentolamine administration in patients with neuropathic pain.** Anesthesia and Analgesia 76:1008-11, 1993.
39. Shir, Y. and Raja S.N. **Indigo carmine-induced severe hypotension in patients undergoing radical prostatectomy.** Anesthesiology 79:378-381, 1993.

40. Raja, S.N. **Diagnosis of sympathetically maintained pain: The past, present and future** Editorial. European Journal of Pain. 14:45-48, 1993.
41. Raja, S.N., Meyer, R.A., Campbell, J.N. **Clonidine: effects on pre- vs. post-junctional adrenoceptors**. Pain 54:361-362, 1993.
42. Shir, Y., Raja, S.N., Frank, S.M. **The effect of epidural vs general anesthesia on postoperative analgesic demand in patients undergoing radical prostatectomy**. Anesthesiology 80 (1):49-56, 1994.
43. Valley, M.A., McKenzie, A.M., Bourke, D.L., Raja, S.N. **Effects of epidural test dose volume on skin perfusion and temperature, and reflex vasoconstriction**. Regional Anesthesia, 19 (1):52-58, 1994.
44. Fleisher, L.A., Frank, S.M., Shir, Y., Estafanous, M., Kelly, S., Raja, S.N. **Cardiac sympathovagal balance and peripheral sympathetic vasoconstriction: Epidural versus general anesthesia**. Anesthesia and Analgesia 79:165-171, 1994.
45. Frank, S.N., Shir, Y., Raja, S.N., Fleisher, L.A., Beattie, C. **Core hypothermia and skin surface temperature gradients: epidural vs. general anesthesia and the effects of age**. Anesthesiology 80 (3):502-508, 1994.
46. Pappagallo, M., Raja, S.N., Haythornthwaite, J., Clark, M., Campbell, J.N. **Oral opioids in the management of post-herpetic neuralgia: A prospective survey**. Analgesia 1:51-55, 1994.
47. Shir, Y., Frank, S.M., Brendler, C.M., Raja, S.N. **Postoperative morbidity is similar in patients anesthetized with either epidural vs. general anesthesia for radical prostatectomy**. Urology 44:232-236, 1994.
48. Frank, S.M., Raja, S.N. **Reflex cutaneous vasoconstriction during cold pressor test is mediated by an a-adrenergic mechanism**. Clinical Autonomic Research 4:257-262, 1994.
49. Raja, SN, North, RB. Highlight on **Paraplegia in a patient with an intrathecal catheter and a spinal cord stimulator** by Aldrete et al. Anesthesiology 81:27A-28A, 1994.
50. Treede, R.D., Meyer, R.A., Raja, S.N., Campbell, J.N. **Evidence for two different heat transduction mechanisms in nociceptive primary afferents innervating monkey skin**. Journal of Physiology 483:747-758, 1995.
51. Raja, S.N. **Role of the sympathetic nervous system in acute pain and inflammation**. Annals of Medicine, 27:241-248, 1995.

52. Kissin, I., Raja, S.N. **Preemptive analgesia, concepts, controversies and caveats.** Pain Digest, 5:5-8, 1995.
53. Shir, Y., Raja, S.N., Brendler, C.B., Frank, S. M. **Intraoperative blood loss during radical retropubic prostatectomy: epidural vs. general anesthesia.** Urology 45:993-999, 1995.
54. Campbell, J.N., Raja, S.N. **Reflex sympathetic dystrophy.** Neurology 45:1235-1236, 1995.
55. Raja, S.N., Choi, Y., Asano, Y., Holmes C., Goldstein, D.S. **Arteriovenous differences in plasma concentrations of catechols in rats with neuropathic pain.** Anesthesiology 83:1000-1008, 1995.
56. Frank, S.M., El-Gamal, N., Raja, S.N., Wu, P.K., Afifi, O. **Role of  $\alpha$ -adrenoceptors in the maintenance of core temperature in humans.** Clinical Science 89:219-225, 1995.
57. Frank, S.M., El-Gamal, N., Raja, S.N., Wu, P.K., Afifi, O.  **$\alpha$ -Adrenoceptor mechanisms of thermoregulation during cold challenge in humans.** Clinical Science 91:627-631, 1996.
58. Raja, S.N., Turnquist, J.L., Meleka, S., Campbell, J.N. **Monitoring adequacy of  $\alpha$ -adrenoceptor blockade following systemic phentolamine administration.** Pain 64:197-204, 1996.
59. Lam, H.D., Hanley, D.F., Trapp, B.D., Saito, S., Raja, S.N., Dawson, T.M., Yamaguchi, H. **Induction of spinal cord neuronal nitric oxide synthase (NOS) after formalin injection in the rat hind paw.** Neuroscience Letters 210:201-204, 1996
60. Choi, Y., Raja, S.N., Moore, L.C., Tobin, J.R. **Neuropathic pain in rats is associated with altered nitric oxide synthase activity in neural tissue.** Journal of Neurological Sciences 138: 14-20, 1996.
61. Raja, S.N. **Is an ounce of preoperative local anesthetic better than a pound of postoperative analgesic?** Editorial, Regional Anesthesia 21:277-280, 1996.
62. Gupta, R, Raja, S.N. **Chronic pain: Pathophysiology and its therapeutic implications.** Current Review of Pain 1:1-9, 1996.
56. Frank, S.M., Raja, S.N., Wu, P.K., El-Gamal, N.  **$\alpha$ -Adrenergic mechanisms of thermoregulation in humans.** Annals N.Y. Acad. Sciences 813:101-110, 1996.
57. Raja, S.N. **Nerve blocks in the evaluation of chronic pain. A plea for caution in their use and interpretation.** Anesthesiology 86:4-6, 1997.

58. Wesselmann, U., Raja, S.N. **Reflex sympathetic dystrophy and causalgia.** Anesthesiology Clinics of North America, 15: 407-427, 1997.
59. Raja, S.N. Highlight: **Assessment of the potency and efficacy of systemic versus intrathecal opioids in rats** by Abram S.E. et al., Anesthesiology 87:27A-29A, 1997.
60. Raja, S.N., Wesselmann, U. Sympathetically maintained pain: **Confusing classification, ill-defined diagnostic criteria, and puzzling pathophysiology.** Commentary, Behavioral and Brain Sciences 20:462, 1997.
56. Raja, S.N. **Peripheral modulatory effects of catecholamines in inflammatory and neuropathic pain.** Advances in Pharmacology, 42:567-571, 1998.
56. Haythornthwaite, J.A., Raja, S.N., Fisher, B., Frank, S.M., Brendler, C.B., Shir, Y. **Pain and quality of life following radical retropubic prostatectomy.** The Journal of Urology 160:1761-1764, 1998.
57. Shir, Y., Ratner, A., Raja, S.N., Campbell, J.N., Seltzer, Z. **Neuropathic pain following partial nerve injury in rats is suppressed by dietary soy.** Neuroscience Letters, 240:73-76, 1998.
58. Ringkamp, M., Grethel, E.J., Choi, Y., Meyer, R.A., Raja, S.N. **Mechanical hyperalgesia after spinal nerve ligation in rat is not reversed by intraplantar or systemic administration of adrenergic antagonists.** Pain 79:135-141, 1999.
56. Ringkamp, M., Eschenfelder, S., Grethel, E.J., Häbler, H.-J., Meyer, R.A., Jänig, W., Raja, S.N. **Lumbar sympathectomy failed to reverse mechanical allodynia- and hyperalgesia-like behavior in rats with L5 spinal nerve injury.** Pain 79:143-153, 1999.
56. Fuchs, P.N., Ringkamp, M., Shiotani, M., Raja, S.N. **Sympathectomy decreases formalin-induced nociceptive responses independent of changes in peripheral blood flow.** Experimental Neurology, 155:95-102, 1999.
57. Fuchs, P.N., Roza, C., Sora, I., Uhl, G., Raja, S.N. **Characterization of mechanical withdrawal responses and effects of  $\mu$ -,  $\delta$ - and  $\kappa$ -opioid agonists in normal and  $\mu$ -opioid receptor knockout mice.** Brain Research 821:480-486, 1999.
58. Mansikka, H., Shiotani, M., Winchurch, R., Raja, S.N. **Neurokinin-1 receptors are involved in behavioral responses to high-intensity heat stimuli and capsaicin-induced hyperalgesia in mice.** Anesthesiology 90:1643-1649, 1999.
59. Frank, S.M., Raja, S.N., Bulcao, C., Goldstein, D. **Relative contribution of core and cutaneous temperatures to thermal comfort and autonomic responses in humans.** J. Appl. Physiol. 86:1588-1593, 1999.

60. Raja, S.N., Haythornthwaite, J.A. **Anesthetic management of the elderly: Measuring function beyond the immediate perioperative horizon.** Editorial, Anesthesiology 91:909-911, 1999.
61. Clark, M.R., Heinberg, L.J., Haythornthwaite, J.A., Quatrano-Piacentini, A.L., Pappagallo, M., Raja, S.N. **Psychiatric symptoms and distress differ between patients with post-herpetic neuralgia and peripheral vestibular disease.** J. Psychosom. Res. 48:51-57, 2000.
62. Pappagallo, M., Oaklander, A.L., Quatrano-Piacentini, A.L., Clark, M.R., Raja, S.N. **Heterogenous patterns of sensory dysfunction in postherpetic neuralgia suggest multiple pathophysiological mechanisms.** Anesthesiology 92:691-698, 2000.
63. Bulcao, C.F., Frank, S.M., Raja, S.N., Tran, K.M., Goldstein, D.S. **Relative contribution of core and skin temperatures to thermal comfort in humans.** J. Therm. Biol. 25:147-150, 2000.
64. Mansikka, H., Sheth, R.N., De Vries, C., Lee, H., Winchurch, R., Raja, S.N. **Nerve injury-induced mechanical but not thermal hyperalgesia is attenuated in neurokinin-1 receptor knockout mice.** Exp. Neurol. 162:343-349, 2000.
65. Gupta, N., Frank, S.M., Ghoneim, N., El-Rahmany, H.K., Talamini, M.A., Zacur, H.A., Raja, S.N. **Thermoregulation and hormone replacement in postmenopausal women.** J. Therm. Biol. 25:165-169, 2000.
66. Tran, K.M., Frank, S.M., Raja, S.N., El-Rahmany, H.K., Kim, L.J., Vu, B. **Lumbar sympathetic block for sympathetically maintained pain: Changes in cutaneous temperatures and pain perception.** Anesthesia & Analgesia 90:1396-1401, 2000
67. Shir, Y., Campbell, J.N., Raja, S.N., Seltzer, Z. **Pre- but not postoperative consumption of soy suppresses pain behavior following partial sciatic ligation in rats.** Proceedings of the 9<sup>th</sup> World Congress on Pain, Vol. 16, IASP Press, Seattle, pp 477-483, 2000
68. Frank, S.M., Raja, S.N., Bulcao, C., Goldstein, D.S. **Age-related thermoregulatory differences during core cooling in humans.** Am. J. Physiol. 279:R349-R354, 2000.
69. Ali, Z., Raja, S.N., Wesselmann, U., Fuchs, P., Meyer, R.A., Campbell, J.N. **Intradermal injection of norepinephrine evokes pain in patients with sympathetically maintained pain.** Pain 88:163-170, 2000.
70. Raja, S.N. **Evidence for a role of adrenoceptors in the signaling of pain in humans,** PSNS SIG (IASP Newsletter), November, pp 2-4, 2000.
71. Raja, S.N., Campbell, J.N. **Risk-benefit ratio for surgical sympathectomy: Dilemmas in clinical decision making.** Commentary, The Journal of Pain 1:261-264, 2000.

72. Raja, S.N., Dougherty, P.M. **Reversing tissue injury-induced plastic changes in the spinal cord: The search for the magic bullet.** Editorial, Regional Anesthesia and Pain Medicine 25:441-444, 2000.
73. Fuchs, P.N., Raja, S.N., Meyer, R.A. **Topical capsaicin for the treatment of neuropathic pain.** Analgesia 5:1-8, 2000.
74. Frank, S.M., El-Rahmany, H.K., Tran, K.M., Vu, B., Raja, S.N. **Comparison of lower extremity cutaneous temperature changes in patients receiving lumbar sympathetic ganglion blocks versus epidural anesthesia.** J. Clin. Anesth. 12:525-530, 2000.
75. Raja, S.N., Haythornthwaite, J.A. **Managing chronic noncancer pain with opioids: The gap between basic science and clinical studies (Review).** Clin. J. Pain 16:270-274, 2000.
76. Fuchs, P.N., Meyer, R.A., Raja, S.N. **Heat, but not mechanical hyperalgesia, following adrenergic injections in normal human skin.** Pain 90:15-23, 2001.
77. Shir, Y., Sheth, R., Campbell, J.N., Raja, S.N., Seltzer, Z. **Soy-containing diet suppresses chronic neuropathic sensory disorders in rats.** Anesthesia & Analgesia 92:1029-1034, 2001.
78. Weng, H.-R., Mansikka, H., Winchurch, R., Raja, S.N., Dougherty, P.M. **Sensory processing in the deep spinal dorsal horn of neurokinin-1 receptor knockout mice.** Anesthesiology 94:1105-1112, 2001.
79. Shir, Y., Raja, S.N., Weissman, C.S., Campbell, J.N., Seltzer, Z. **Consumption of soy diet prior to nerve injury preempts the development of neuropathic pain in rats.** Anesthesiology 95:1238-1244, 2001.
80. Wu, C.L., Tella, P., Staats, P.S., Vaslav, R., Kazim, D., Wesselmann, U., Raja, S.N. **Analgesic effects of intravenous lidocaine and morphine on post-amputation pain: A randomized double-blind, active-placebo-controlled, crossover trial.** Anesthesiology 96:841-8, 2002.
81. Raja, S.N., Grabow, T. **Complex Regional Pain Syndrome I (Reflex Sympathetic Dystrophy).** Anesthesiology 96:1254-60, 2002.
82. Wu, C.L., Raja, S.N. **Optimizing postoperative analgesia: the use of global outcome measures.** Anesthesiology, 97:533-4, 2002.
83. Mansikka, H. Zhou, L., Donovan, D.M., Pertovaara, A., Raja, S.N. **The role of  $\mu$ -opioid receptors in inflammatory hyperalgesia and  $\alpha_2$ -adrenoceptor mediated antihyperalgesia.** Neuroscience, 113:339-349, 2002.

84. Raja, S.N., Haythornthwaite, J.A., Pappagallo, M., Clark, M.R., Travison, T.G., Sabeen, S., Royall, R.M., Max, M.B. **Opioids versus antidepressants in postherpetic neuralgia: a randomized placebo-controlled trial.** Neurology, 59:1015-1021, 2002.
85. Shir, Y., Campbell, J.N., Raja, S.N., Seltzer, Z. **The correlation between dietary soy phytoestrogens and neuropathic pain behavior in rats after partial denervation.** Anest Analg, 94:421-6, 2002.
86. O’Gorman, D.A., Raja, S.N. **Drug infusions for the diagnosis and treatment of chronic pain.** Current Pain and Headache Reports, 6 (6):452-9, 2002.
87. Panlilio, L.M., Christo, P.J., Raja, S.N. **Current Management of Postherpetic Neuralgia.** The Neurologist, 8:339-350, 2002.
88. Berde, C.B., Brennan, T.J., Raja, S.N. **Opioids: more to learn, improvements to be made.** Editorial in Anesthesiology, 98 (6):1309, 2003.
89. Tao, F., Tao, Y.-X., Mao, P., Zhao, C., Li, D., Liaw, W.-J., Raja, S.N., Johns, R.A. **Intact carrageenan-induced thermal hyperalgesia in mice lacking inducible nitric oxide synthase.** Neuroscience, 120:847-54, 2003.
90. Tao, Y.-X., Rumbaugh, G., Wang, G., Petralia, R.S., Zhao, C., Kauer, F.W., Tao, F., Zhuo, M., Wenthold, R.J., Raja, S.N., Huganir, R.L., Brecht, D.S., Johns, R.J. **Impaired NMDA receptor-mediated postsynaptic function and blunted NMDA receptor-dependent persistent pain in mice lacking PSD-93 protein.** Journal of Neuroscience, 23:6703-12, 2003.
91. Pogatzki, E.M., Raja, S.N. **A mouse model of incisional pain.** Anesthesiology, 99:1023-7, 2003.
92. Grabow, T.S., Tella, P.K., Raja, S.N. **Spinal cord stimulation for complex regional pain syndrome: an evidence-based medicine review of the literature.** Clinical Journal of Pain, 19:371-83, 2003.
93. Haythornthwaite, J.A., Clark, M.R., Pappagallo, M., Raja, S.N. **Pain coping strategies play a role in the persistence of pain in post-herpetic neuralgia.** Pain, 106:453-60, 2003.
94. Tall, J.M., Raja, S.N. **Dietary constituents as novel therapies for pain.** Clinical Journal of Pain, 20:19-26, 2004.
95. Zhao, C-S., Tao, Y-X., Tall, J.M., Donovan, D.M., Meyer, R.A., Raja, S.N. **Role of  $\mu$ -opioid receptors in formalin-induced pain behavior in mice.** Exp Neurol, 184:839-45, 2003.

96. Wu, C.L., Hsu, W., Richman, J., Raja, S.N. **Postoperative cognitive function as an outcome of regional anesthesia and analgesia.** Regional Anesthesia and Pain Medicine, 29:257-68, 2004.
97. Zhao, C., Tall, J.M., Meyer, R.A., Raja, S.N. **Anti-allodynic effects of systemic and intrathecal morphine in the spared nerve injury model of neuropathic pain in rats.** Anesthesiology, 100:905-11, 2004.
98. Mansikka, H., Zhao, C., Sheth, R., Sora, I., Uhl, G., Raja, S.N. **Nerve injury induces a tonic bilateral  $\mu$ -opioid receptor mediated inhibitory effect on mechanical allodynia in mice.** Anesthesiology, 100:912-21, 2004.
99. Zhao, C., Wacnik, P.W., Tall, J.M., Johns, D.C., Wilcox, G.L., Meyer, R.A., Raja, S.N. **Analgesic effects of a soy-containing diet in three murine bone cancer-pain models.** Journal of Pain, 5:104-10, 2004.
100. Tall, J.M., Seeram, N.P., Zhao, C., Nair, M.G., Meyer, R.A., Raja, S.N. **Tart cherry anthocyanins suppress inflammation-induced pain behavior in rat.** Behavioural Brain Research, 153:181-8, 2004.
101. Christo, P.J., Grabow, T.S., Raja, S.N. **Opioid effectiveness, addiction, and depression in chronic pain.** Adv Psychosom Med, 25:123-37, 2004.
102. Grabow, T.S., Christo, P.J., Raja, S.N. **Complex regional pain syndrome: diagnostic controversies, psychological dysfunction, and emerging concepts.** Adv Psychosom Med, 25:89-101, 2004.
103. Tao, Y-X, Raja, S.N. **Synaptic MAGUK proteins and chronic pain.** Trends in Pharmacological Sciences, 25:397- 400, 2004.
104. Block, B.M., Hurley, R.W., Raja, S.N. **Mechanism-based therapies for pain.** Drug News and Perspectives, 17:187-94, 2004.
105. Francis, J.A., Raja, S.N., Nair, M.G. **Bioactive terpenoids and guggulusteroids from *commiphora mukul* gum resin.** Chemistry and Biodiversity, in press 2004.
106. Gottschalk, A., Raja, S.N. **Severing the link between acute and chronic pain: the anesthesiologist's role in preventive medicine.** Anesthesiology, in press 2004.

#### **BOOK REVIEWS (in peer-reviewed journals):**

Raja, S.N., Grabow, T. Anesthesiology, 2002. *Complex Regional Pain Syndrome, Vol.22.* (Eds., Harden et al.) IASP Press, 2001.

#### **ELECTRONIC PUBLICATIONS:**



Tella, P., Raja, SN. (2002, Feb 28). **Is Complex Regional Pain Syndrome a regional syndrome?** Editorial. MD Consult: Pain Medicine, Perspectives on contemporary Topics. Retrieved on June 23, 2004 from <http://www.mdconsult.com>

Tall, JM., Raja, SN. (2002, Dec 20). **Could some soy each day keep the pain doctor away?** Editorial. MD Consult: Pain Medicine, Perspectives on contemporary Topics. Retrieved on March 24, 2003 from <http://www.mdconsult.com>

Raja, SN. (2004, June 23). **Is postherpetic neuralgia a preventable disease?** Editorial. MD Consult: Pain Medicine, Perspectives on contemporary Topics. Retrieved on June 23, 2004 from <http://www.mdconsult.com>

### **MONOGRAPHS:**

1. Raj, P., Erdine, S., Niv, D. and Raja, S., Editors, **Management of Pain: A World Perspective**, Sixth International Congress Pain Clinic, Monduzzi Editore, Bologna, Italy, 1995.
2. Benzon, H.T., Raja, S.N., Borsook, D., Molloy, R.E., Strichartz, G., Editors, **Essentials of Pain Medicine**, Churchill Livingstone, Philadelphia, 1999.
3. Benzon, H.T., Raja, S.N., Molloy, R.E., Liu, S., Fishman, S.M.. Editors, **Essentials of Pain Medicine**, W.B. Saunders Company, New York, 2004.

### **BOOK CHAPTERS:**

1. Meyer, R.A., Campbell, J.N., Raja, R.N. **Hyperalgesia following peripheral nerve injury**, in: Effects of Injury on Spinal and Trigeminal Somatosensory Systems, L.M. Poulos and B.J. Sessle (eds.), Alan R. Liss, Inc., New York, pp. 383-388, 1987.
2. Campbell, J.N., Raja, S.N., Cohen, R.H., Manning, D.C., Khan, A.A., Meyer, R.A. **"Peripheral neural mechanisms of nociception"**, In: Textbook of Pain, 2nd Edition, Wall and Melzack (eds.), Churchill Livingstone, New York, pp. 22-45, 1989.
3. Raja, S.N., Campbell, J.N., and Meyer, R.A. **Hyperalgesia and sensitization of primary afferent fibers**, In: Pain Syndromes in Neurological Practice, H.L. Fields (ed.), Butterworth, London, pp. 19-45, 1990.
4. Meyer, R.A., Campbell, J.N., and Raja, S.N. **The role of nociceptors and low-threshold mechanoreceptors in the pain to light touch observed in sympathetically-maintained pain**, In: Lesions of Primary Afferent Fibers as a Tool for the Study of Clinical Pain, G. Guilbaud and J. M. Besson (ed), Elsevier Science Publishers, pp 307-314, 1991.
5. Campbell, J.N., Raja, S.N., and Meyer, R.A. **How should sympathetically maintained pain be diagnosed: A case study**, In: Lesions of primary afferent fibers as a tool for the study of clinical pain, G. Guilbaud and J.M. Besson (ed), Elsevier Science Publishers, pp 45-51, 1991.

6. Meyer, R.A., Raja, S.N., Treede, R.-D., Davis, K.D., and Campbell, J.N. **Neural mechanisms of sympathetically maintained pain**, In: Pathophysiological Mechanisms of Reflex Sympathetic Dystrophy, W. Janig and R. Schmidt (eds.), pp. 141-150, 1992.
7. Campbell, J.N., Meyer, R.A., Davis, K.D., and Raja, S.N. **Sympathetically maintained pain: A unifying hypothesis**, In: Hyperalgesia, W. D. Willis (ed.), Raven Press, New York 1992.
8. Raja, S.N. and Hendler, N. **Sympathetically maintained pain**. In: Current Practice in Anesthesiology, M.C. Rogers (ed.), B.C. Decker, Inc., Philadelphia, pp 421-425, 1992.
9. Raja, S.N., Meyer, R.A., and Campbell, J.N. **Intravenous phentolamine: A placebo-controlled diagnostic test for sympathetically maintained pain** In: Pain and the Sympathetic Nervous System Newsletter, pp 2-3, 1992.
10. Campbell, J.N., Raja, S.N., Meyer, R.A. **Pain and the sympathetic nervous system connecting the loop**. In: New Trends in Referred Pain and Hyperalgesia, Ed. Lvecchiet, D. Alle-Iessard, Ulindblum, MA.Gianberardino, Elsevier Science Publisher, pp. 99-108, 1993.
11. Campbell, J.N., Raja S.N., Selig D.K., Belzberg, A.J., Meyer, R.A. **Diagnosis and management of sympathetically maintained pain**. In: Progress in Pain Research and Management, Vol.1, Edited by H.L. Fields, J.C. Liebeskind, pp. 85-100, 1994.
12. Campbell, J.N., Raja, S.N., Belzberg, A.J., Meyer R.A. **Hyperalgesia and the sympathetic nervous system. In Touch, temperature and pain in Health and Disease: Mechanism and Assessments**. In: Progress in Pain Research and Management Vol.3, Edited by Bovie J., Hanson P., and Lindblom U. IASP Press, Seattle, pp. 249-264, 1994.
13. Frank, S.M., Raja, S.N., Fleischer, L.A., Beattie, C., Higgins, M.S., Breslow, M.J. **Cardiovascular and adrenergic manifestations of cold stress**. In: Thermal Balance in Health and Disease, Advances in Pharmacological Sciences, pp. 325-331. 1994.
14. Meyer, A., Campbell, J.N., Raja, S.N. **Peripheral neural mechanisms of nociception**. In: Textbook of Pain, 3rd Edition, Wall and Melzack (eds.), Churchill Livingstone, New York, pp. 13-44, 1994.
15. Manning, D., Churcher, M., Raja S.N. **Diagnosis of reflex sympathetic dystrophy and therapeutic strategies based on pathophysiology**. In: Current Review of Pain, Ed. Prithvi P. Raj Current Medicine, Philadelphia, pp. 195-208, 1994.
16. Choi, Y., Raja, S.N., **Chronic Pain: Pathophysiology and Rationale for Treatment**. In: Management of Pain: A World Perspective, P. Raj, S. Erdine, D. Niv, S. Raja (eds.) Monduzzi Editore, Bologna, Italy, pp. 95-105, 1995.

17. Wesselmann, U., Raja, S.N., Campbell, J.N. **Sympathetic maintained pain in autonomic nervous system in physical medicine and rehabilitation: State of the art reviews.** Ed. R.W. Teassell, Hanley and Belfus, Philadelphia, Vol 10, pp. 137-151, 1996.
18. Meyer, R.A., Raja, S.N., Campbell, J.N. **Neural mechanisms of primary hyperalgesia.** In: Neurobiology of Nociceptors, Belmonte C, Cervero F (eds.), Oxford University Press, pp. 370-389, 1996.
19. Choi, Y., Raja, S.N. **Chronic Pain: pathophysiology and rationale for treatment.** In: Pain Management - A World Perspective, Raj PP, Erdine S, Niv D, Raja SN, (eds.) Monduzzi Editore, Bologna, Italy, pp. 95-104, 1996.
20. Haythornthwaite, J.A., Raja, S.N. **Commentary: What is a successful outcome of pain.** In: Pain Treatment Centers at a Crossroads: A Practical and Conceptual Reappraisal, Progress in Pain Research and Management, edited by M.J. Cohen and J.N. Campbell, IASP Press, Seattle, Vol. 7, pp 203-207, 1996.
21. Shir, Y., Ratner, A., Raja, S.N., Campbell, J.N., Seltzer, Z. **The effect of diet on neuropathic pain expression in rats.** In: Pain Mechanisms and Management, edited by S.A. Ayrapetyan, A.V. Apkarian, Ios Press, New York, pp 139-158, 1997.
21. Raja, S.N., Meyer, R.A., Campbell, J.N. **Transduction properties of the sensory afferent fibers.** In: Anesthesia: Biological Foundations, T. L. Yaksh, C. Lynch, W. M. Zapol, M. Maze, J.F. Biebuyck, L.J. Saidman (eds). Lippincott-Raven Press, Philadelphia, pp. 515-530, 1998.
23. Raja, S.N. **Sympathetically maintained pain.** In: Atlas of Anesthesiology, edited by R.D. Miller, Current Medicine, Philadelphia, Vol. VI, pp 6.1-6.14, 1998.
24. Raja, S.N., Dougherty, P.M. **Pain and the neurophysiology of somatosensory processing.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 2-6, 1999
25. Dougherty, P.M., Raja, S.N. **Pain and the neurochemistry of somatosensory processing.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 7-9, 1999.
26. Mitchell, V.C., Raja, S.N. **Preemptive analgesia - Pathophysiology.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 140-141, 1999.

27. Mitchell, V.C., Raja, S.N. **Preemptive analgesia - Clinical studies.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 143-146, 1999.
28. Guarino, A., Raja, S.N. **Terminology and pathophysiology of complex regional pain syndromes.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 245-247, 1999.
29. Guarino, A., Raja, S.N. **Diagnosis of complex regional pain syndrome.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 248-251, 1999.
30. Raja, S.N. **Phentolamine infusion test.** In: Essentials of Pain Medicine and Regional Anesthesia, edited by H.T. Benzon, S.N. Raja, D. Borsook, R.E. Molloy, G. Strichartz, Churchill Livingstone, Philadelphia, pp. 252-254, 1999.
31. Raja, S.N., Meyer, R.A., Ringkamp, M., Campbell, J.N. **Peripheral neural mechanisms of nociception.** In: Textbook of Pain, 4<sup>th</sup> Edition, edited by P. Wall and R. Melzack, Churchill Livingstone, New York, pp. 11-57, 1999.
32. Gupta, M.A., Haddox, J.D., Raja, S.N. **Complex regional pain syndromes and sympathetically maintained pain.** In: The Pain Clinic Manual, 2<sup>nd</sup> Edition, edited by S.E. Abram and J.D. Haddox, Lippincott Williams & Wilkins, Philadelphia, pp. 177-184, 2000.
33. O’Gorman, D.A., Raja, S.N. **Infusion Tests and Therapies in the Management of Chronic Pain.** In: Practical Management of Pain, 3<sup>rd</sup> Edition, edited by Raj P.P., Mosby Inc., St. Louis, pp 723-731, 2000.
34. Walia, K., Raja, S.N. **Complex Regional Pain Syndromes (Reflex Sympathetic Dystrophy and Causalgia).** In: Current Therapy in Neurological Diseases, 6<sup>th</sup> Edition, edited by Johnson, R.T., Griffin, J.W., McArthur, J.C., Mosby, Inc., St. Louis, pp 71-74, 2001.
35. Baron, R., Raja, S.N. **Role of adrenergic transmitters and receptors in nerve and tissue injury related pain.** In: Mechanisms and Mediators of Neuropathic Pain, edited by Chaplan, S.R., Malmberg, A., Birkhauser Verlag, 2002.
36. Panlilio, L., Tella, P., Raja, S.N. **Neuropathic pain: Outcome studies on the role of nerve blocks.** In: Textbook of Regional Anesthesia, edited by Raj, P.P., W.B. Saunders Churchill Livingstone, Philadelphia, pp 969-987, 2002.
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**ABSTRACTS AND PRESENTATIONS:**

## INTERNATIONAL MEETINGS:

Meyer, R.A., Raja, S.N., Campbell, J.N. Coupling of action potential activity between unmyelinated fibers in the peripheral nerve of monkeys. Presented at the IVth World Congress on Pain, Seattle, 1984.

Raja, S.N., Campbell, J.N., Meyer, R.A., MacKinnon, S.E. Hyperalgesia following peripheral nerve injury is signaled by myelinated fibers. Presented at the IVth World Congress on Pain, Seattle, 1984.

Campbell, J.N., Meyer, R.A., Raja, S.N. Hyperalgesia: New insights, Invited plenary session, IVth World Congress on Pain, Seattle, 1984.

Raja, S.N., Campbell, J.N., Meyer, R.A. Effects of general anesthetics on response of nociceptive primary afferents in monkeys. Presented at the Third International Conference on Anesthesia, Calgary, 1984.

Raja, S.N., Campbell, J.N., Meyer, R.A., Frost, S.A. Does hyperalgesia to cold stimuli characterize patients with sympathetically maintained pain (Reflex Sympathetic Dystrophy)? Presented at the Vth World Congress on Pain, Hamburg, 1987.

Manning, D.C., Khan, A.A., Campbell, J.N., Meyer, R.A., Raja, S.N. Bradykinin induced cutaneous pain is independent of wheal and flare. Presented at the Vth World Congress on Pain, Hamburg, 1987.

Raja, S.N., Meyer, R.A., Campbell, J.N. Sensory testing in patients with sympathetically maintained or sympathetically independent chronic pain. Presented at the IXth World Congress of Anesthesiologists, Washington, D.C., 1988.

Davis, K.D., Campbell, J.N., Raja, S.N., Treede, R.-D., Lin, C., and Meyer, R.A. Topical application of an alpha2-adrenergic agonist relieves hyperalgesia in sympathetically-maintained pain: A case study. Presented at the VIth World Congress in Pain, Adelaide, Australia, 1990. Pain 47:309-318, 1991.

Treede, R.-D., Raja, S.N., Davis, K.D., Meyer, R.A., and Campbell, J.N. Evidence that alpha-adrenergic receptors mediate sympathetically maintained pain (reflex sympathetic dystrophy). Presented at the VIth World Congress on Pain, Adelaide, Australia, 1990. Pain Suppl. 5, 944, 1990

Raja, S.N., Kozak, S.L., Manning, D.C., Meyer, R.A., and Campbell, J.N. Intradermal bradykinin induces hyperalgesia to heat stimuli in man, Presented at the VIth World Congress on Pain, Adelaide, Australia, 1990. Pain Suppl. 5, 255, 1990.

Shir, Y., Raja, S.N. Pre-emptive epidural anesthesia decreases postoperative analgesic demand in patients undergoing radical prostatectomy. Presented at the VII World Congress on Pain, Paris, France, 1993.

Pappagallo, M., Raja, S.N., Campbell, J.N. Efficacy of opioids in the long-term management of post herpetic neuralgia. Presented at the VII World Congress on Pain, Paris, France, 1993.

Raja, S.N., Turnquist, J.L. Regulation of cutaneous blood flow in patients with neuropathic pain. Presented at the VII World Congress on Pain, Paris, France, 1993.

Frank, S.M., Raja, S.N. Peripheral vasoconstriction during cold pressor test is attenuated by alpha-adrenergic blockade. Proceedings of the Pharmacology of Thermoregulation, Geissen, Germany, 1994.

Grethel, E.J., Ringkamp, M., Meyer, R.A., and Raja, S.N. Intraplantar administration of alpha-adrenergic antagonists does not alter responses of neuropathic rats to mechanical and cold stimuli, VIIIth World Congress on Pain, Vancouver, Canada, 1996.

Meyer, R.A., Raja, S.N. Intradermal norepinephrine produces a dose dependant hyperalgesia to heat in humans, VIIIth World Congress on Pain, Vancouver, Canada, 1996.

Haythornthwaite, J.A., Shir, Y., Raja, S.N., Frank, S.R. Chronic Pain Following Radical Prostatectomy, VIIIth World Congress on Pain, Vancouver, Canada, 1996.

M.Clark, M.R., Haythornthwaite, J.A., Pappagallo, M., Heinberg, L.J., Raja, S.N., Kiri, N., Pappagallo, M. Psychiatric Symptoms in Post-Herpetic Neuralgia, VIIIth World Congress on Pain, Vancouver, Canada, 1996.

Kiri, N., Raja, S.N., Pappagallo, M., M.Clark, M.R., Haythornthwaite, J.A. Differential somatosensory changes in postherpetic neuralgia, VIIIth World Congress on Pain, Vancouver, Canada, 1996.

Raja, S.N., Haythornthwaite, J., Pappagallo, M., Clark, M., Max, M. Controlled trial on the efficacy of opioids and tricyclic antidepressants in postherpetic neuralgia (PHN), 9<sup>th</sup> World Congress on Pain, Vienna, Austria, 1999.

Vu, B., Tran, K., Frank, S., El-Rahmany, H., Raja, S. Epidural and lumbar sympathetic ganglion blocks result in comparable efficacy of sympathetic blockade, 9<sup>th</sup> World Congress on Pain, Vienna, Austria, 1999.

Mansikka, H., Sheth, R., Shiotani, M., Winchurch, R., Raja, S.N. Capsaicin and nerve injury-induced hyperalgesia is attenuated in neurokinin-1 receptor knockout mice, 9<sup>th</sup> World Congress on Pain, Vienna, Austria, 1999.

Campbell, J.N., Raja, S.N., Shir, Y. Suppression of hyperalgesia in a rat nerve injury model by dietary soy may not depend on phytoestrogen, 9<sup>th</sup> World Congress on Pain, Vienna, Austria, 1999.

Irving G, Schwartzman R, Wallace M, Dogra S, Rauck R, Raja S, Cooper A, Faleck H, Zeldis J, Manning D: A multicenter, open-label study to evaluate the efficacy of lenalidomide (CC-5013) in the treatment of type-1 complex regional pain syndrome - functional assessment results. 7<sup>th</sup> International Conference on the Mechanisms and Treatment of Neuropathic Pain, Bermuda, 2004.

Dogra S, Schwartzman R, Irving G, Wallace M, Rauck R, Raja S, Cooper A, Faleck H, Zeldis J, Manning D: A multicenter, open-label study to evaluate the safety and efficacy of lenalidomide (CC-5013) in the treatment of type-1 complex regional pain syndrome - pain and safety results. 7<sup>th</sup> International Conference on the Mechanisms and Treatment of Neuropathic Pain, Bermuda, 2004.

#### **NATIONAL MEETINGS:**

Raja, S.N., Guyenet, P.G.: Mechanism of action of phencyclidine (PCP) in the CNS: An iontophoretic study. Society for Neuroscience Abstracts. 6:791, 1980.

Raja, S.N., Moscicki, M.S., DiFazio, C.A.: Phencyclidine alters MAC: Possible mechanisms. Anesthesiology. 55:A223, 1981.

Raja, S.N., Meyer, R.A., Campbell, J.N., Burke, R.: General anesthetics affect the response of primary nociceptive afferents in primates. Society for Neuroscience Abstract 8:855, 1982.

Campbell, J.N., Meyer, R.A., Raja, S.N., Burke, R., Aryanpur, J.J.: Neural mechanisms of hyperalgesia: effects of partial injury to the receptive field of nociceptive afferents. Society for Neuroscience Abstract 8:855, 1982.

Meyer, R.A., Campbell, J.N., Raja, S.N., MacKinnon, S.E., Burke, R., and Dellon, A.L., Neural activity originating from a neuroma in the baboon, Society for Neuroscience Abstract 8:855, 1982.



Raja, S.N., Meyer, R.A., Campbell, J.N., Burke, R.: Sensitization of unmyelinated nociceptive afferents by halothane. Thirteenth Annual Meeting of the Society for Neuroscience, Boston, 1983. Society for Neuroscience Abstract 9:780, 1983.

Raja, S.N., Campbell, J.N., Meyer, R.A.: Evidence for different mechanisms for primary and secondary hyperalgesia. Fourth Annual Meeting of the American Pain Society, Chicago, 1983.

Raja, S.N., Meyer, R.A., Campbell, J.N., Burke, R.: The response of nociceptive afferents in the peripheral nerve to cutaneous heat stimuli is altered by general anesthetics, 57th Congress of Inter. Anesth. Res. Soc., New Orleans, 1983.

Raja, S.N., Meyer, R.A., Campbell, J.N., Burke, R.: Halothane sensitizes nociceptive C-fibers in monkeys. Annual Meeting of the American Society of Anesthesiologists, Atlanta, 1983. Anesthesiology 59: A382, 1983.

Meyer, R.A., Campbell, J.N., and Raja, S.N.: Characteristics of primary and secondary hyperalgesia differ. Society for Neuroscience Abstract 10:108, 1984.

Raja, S.N., Campbell, J.N., Meyer, R.A., MacKinnon, E.E.: Myelinated fibers in peripheral nerves signal the hyperalgesia that follows nerve injury. Anesthesiology 61:A199, 1984.

Meyer, R.A., Campbell, J.N., Raja, S.N. Antidromic nerve stimulation in monkey does not sensitize C-fiber nociceptors to heat. Society for Neuroscience Abstract 11:121, 1985.

Raja, S.N., Meyer, R.A., Campbell, J.N., Khan, A.A.: Narcotics do not alter response of C-fiber nociceptive afferents in monkeys. Society for Neuroscience Abstract 11:121, 1985.

Campbell, J.N., Meyer, R.A., Kahn, A.A., Raja, S.N.: Hyperalgesia to heat in human subjects and sensitization of C-nociceptors in monkeys do not occur adjacent to mechanical injury of the hairy skin. Society for Neuroscience Abstract 11:121, 1985.

Koschorke GM., Meyer RA, Raja SN: Neural response of monkey neuroma to bradykinin and adrenaline. 6th Annual Mtg of the American Pain Society, Dallas, 1985.

- Raja, S.N., Meyer, R.A., Campbell, J.N., Khan, A.A.: Narcotics do not affect the response of unmyelinated afferents in monkeys. American Society of Regional Anesthesia, 1986.
- Campbell, J.N., Khan, A.A., Meyer, R.A., Raja, S.N.: The wide dynamic range response of primary afferent nociceptors that innervate hairy in monkeys. Society for Neuroscience Abstract 12:31 1986.
- Raja, S.N., Meyer, R.A., Khan, A.A., Campbell, J.N.: Effects of general anesthetics on response of low-threshold, slowly - adapting mechanoreceptor. Society for Neuroscience Abstract 12:335 1986.
- Raja, S.N., Campbell, J.N., Meyer, R.A., Frost, S.A., Khan, A.A.: Sensory testing in patients with causalgia or reflex sympathetic dystrophy. Seventh Annual Meeting of the American Pain Society, Washington, D.C., 1986.
- Khan, A.A., Raja, S.N., Campbell, J.N., Hartke, T.V., and Meyer, R.A., "Bradykinin sensitizes nociceptors to heat stimuli," Society for Neuroscience Abstract 12:218, 1986.
- Meyer, R.A., Campbell, J.N., and Raja, S.N., "Hyperalgesia following peripheral nerve injury," Symposium on the Effects of Injury on the Somatosensory System, Oregon, 1986.
- Raja, S.N., Manning, D.C., Campbell, J.N., and Meyer, R.A., Bradykinin sensitizes nociceptors to heat. Substance P and Neurokinins Symposium, Montreal, July, 1986.
- Manning, D.C., Khan, A.A., Campbell, J.N., Meyer, R.A., and Raja, S.N., "Bradykinin induced cutaneous pain is independent of wheal and flare," Pain, Suppl. 4, S16, 1987.
- Campbell, J.N., Raja, S.N., and Meyer, R.A., Painful sequelae of nerve injury. Pain, Suppl. 4:S334, 1987.
- Raja, S.N., Campbell, J.N., Meyer, R.A., Frost, S.A., and Khan, A.A., "Does hyperalgesia to cold stimuli characterize patients with sympathetically maintained pain (Reflex Sympathetic Dystrophy)?" Pain, Suppl. 4:S344, 1987.
- Khan, A.A., Raja, S.N., Meyer, R.A., Campbell, J.N., and Manning, D.C., Bradykinin antagonists sensitize cutaneous C-fiber nociceptors in monkey. Canadian and American Pain Soc. Joint Meeting, Toronto, 1988.

Campbell, J.N., Raja, S.N., Meyer, R.A.: Sympathetic nervous system and nerve injury pain. Neurosurgical Society of America, Hot Springs, Virginia, 1988.

Khan, A.A., Raja, S.N., Meyer, R.A., Campbell, J.N., Manning, D.C.: C-fiber nociceptors in monkey are sensitized by bradykinin antagonists. Society for Neuroscience, Toronto, November, 14:192, 1988.

Raja, S.N., Treede, R.-D., Davis, K.D, Campbell, J.N., Tewes, P.A., Empting-Koschorke, L.D.: Systemic alpha-adrenergic antagonist relieves sympathetically maintained pain. Tenth Annual Meeting of the American Pain Society, 1989.

Treede, R.-D., Raja, S.N., Davis, K.D., Tewes, P.A., Campbell, J.N.: Pain relief during sympathetic blockade is not secondary to skin temperature change. Tenth Annual Meeting of the American Pain Society, 1989.

Kozak, S.L., Meyer, R.A., Raja, S.N., Manning, D.C., Campbell, J.N.: Evidence that bradykinin induced cutaneous pain is not mediated by histamine release. Society for Neuroscience Abstract 15:439, 1989

Raja, S.N., Treede, R.-D., Tewes, P.A., Davis, K.D., Lin, C., Campbell, J.N.: A new diagnostic test for sympathetically maintained pain: Systemic phentolamine administration. Annual Meeting of the American Society of Anesthesiologists, 1989.

Davis, K.D., Campbell, J.N., Raja, S.N., Treede, R.-D., Lin, C. and Meyer, R.A.: Topical application of an alpha<sub>2</sub>-adrenergic agonist relieves hyperalgesia in sympathetically maintained pain: A case study. Pain, Suppl. 5, S421, 1990.

Raja, S.N., Mitzel, E.L., and Campbell, J.N., Prostaglandin E<sub>1</sub> sensitizes cutaneous nociceptors in monkey. Society for Neuroscience Abstract 175.3, 1990.

Davis, K.D., Raja, S.N., Treede, R.-D., Meyer, R.A., and Campbell, J.N., Topical application of clonidine eliminates hyperalgesia at site of administration in patients with sympathetically-maintained pain. Eleventh Annual Meeting of the American Pain Society, St. Louis, 1990.

Dickstein, R., Raja, S.N., Johnson, C. Comparison of intraarticular bupivacaine and morphine for analgesia following arthroscopic knee surgery. Anesthesiology 75:A767, 1991.

Raja, S.N., Treede, R.D., Davis, K.D., Campbell, J.N. Systemic alpha-adrenergic blockade with phentolamine: A diagnostic test for sympathetically maintained pain. Anesthesiology 74 (4):691-698, 1991.

Meyer, R.A., Davis, K.D., Raja, S.N., Campbell, J.N. Sympathectomy does not abolish bradykinin-induced hyperalgesia to heat in human. Society for Neuroscience Abstract (17) 120.10, 1991.

Valley, M.A., Bourke, D.L., McKenzie, A.M., Raja, S.N. Quantitative testing of sympathetic function with laser doppler flowmetry. Presented at the Annual meeting of the American Society of Anesthesiologists, New Orleans, 1992. Anesthesiology 77:A882, 1992.

Valley, M.A., McKenzie, A.M., Bourke, D.L., Raja, S.N. Effects of epidural test dose on sympathetic function as measured by laser doppler. Presented at the Annual meeting of the American Society of Anesthesiologist, New Orleans, 1992. Anesthesiology 77:A883, 1992.

McKenzie, A.M., Valley, M.A., Raja, S.N. Does phentolamine block sympathetically mediated vasoconstrictive responses? Thirteenth Annual Meeting of the American Pain Society, San Diego, 1992.

Raja, S.N., Turnquist, J.L. Effect of alpha-adrenergic blockade on vascular response in neuropathic pain. Regional Anesthesia 18 (4S):24, 1993.

Shir, Y., Raja, S.N., Brendler, C.B., Frank, S.M. Intraoperative blood loss during radical prostatectomy: comparison of epidural versus general anesthesia. Annual Meeting of the American Society of Anesthesiologists, Washington, DC, 1993. Anesthesiology 79(3A): A898, 1993.

Shir, Y., Raja, S.N. The effect of epidural versus general anesthesia on postoperative analgesic demand in patients undergoing radical prostatectomy Annual Meeting of the American Society of Anesthesiologists, Washington, DC, 1993. Anesthesiology 79(3A): A901, 1993

Frank, S., Shir, Y., Fleisher, L., Kelly, S., Raja, S.N. Core temperature changes and upper extremity temperature gradients: epidural versus general anesthesia. Annual Meeting of the American Society of Anesthesiologists, Washington, DC, 1993. Anesthesiology 79(3A): A195, 1993.

Fleisher, L.A., Shir, Y., Kelly, S., Raja, S.N., Frank, S.M. Cardiac sympathetic activation: epidural versus general anesthesia. Anesthesiology 79(3A): A1245, 1993.

- Raja, S.N. Drug infusions and nerve blocks in pain diagnosis. Fourteenth Annual Meeting of the American Pain Society, Florida, 1993.
- Raja, S.N, Choi, Y., Tobin, J.R., Moore, L. Neuropathic pain in rats is associated with altered nitric oxide synthase activity in neural tissue. Annual meeting of the American Society of Anesthesiologists, San Francisco, 1994. Anesthesiology 81(3A): A813, 1994.
- Merritt, W.T., Fleckenstein, J.F., Frank, S.M., Fleisher, L.A., Raja, S.N., Thuluvath, P.J. Autonomic dysfunction in end-stage liver disease: Does it correlate with disease severity? Anesthesiology 81:A537, 1994.
- Raja, S.N., Meleka, S.M., Turnquist, J.L., Campbell, J.N. Monitoring adequacy of  $\alpha$ -adrenoceptor blockade following systemic phentolamine administration. Fifteenth Annual Meeting of the American Pain Society, Florida, 1994.
- Meleka, S.M., Raja, S.N., Turnquist, J.L., Campbell, J.N. Placebo responses pose an infrequent problem in the phentolamine test for sympathetically maintained pain (SMP). Fifteenth Annual Meeting of the American Pain Society, Florida, 1994.
- Choi, Y., Meyer, R.A., Campbell, J.N., Raja, S.N. Heat pain threshold is not altered in rats with neuropathic pain. Fifteenth Annual Meeting of the American Pain Society, Florida, 1994.
- Choi, Y., Yamaguchi, H, Hanley, D.F., Raja, S.N. Neuropathic pain in rats is associated with increased nitric oxide synthase (NOS) positive neurons in spinal cord. Society for Neuroscience Abstract (20) 233.10, 1994.
- Tobin, J.R., Raja, S.N., Moore, L, Choi, Y. Neuropathic pain (NP) in rat is associated with altered nitric oxide synthase activity in neural tissue. Society for Neuroscience Abstract (20) 320.14, 1994.
- Frank, S.M., Raja, S.N. Peripheral vasoconstriction during cold stress is mediated by an  $\alpha$ -adrenoceptor mechanism. Anesthesiology 81:A237, 1994.
- Fleckenstein, J.F., Frank, S.M., Raja, S.N. Autonomic neuropathy in patients awaiting liver transplantation. American Society of Gastroenterology, 1994.
- El-Gamal, N., Frank, S.M., Raja, S.N., Afifi, O.  $\alpha$ -adrenoceptor mechanism of thermoregulation. International Anesthesiology Research Society, 1995.

Hogan, Q, Raja, S.N., Abram, S. Diagnostic techniques for sympathetically maintained pain. Sixteenth Annual Meeting of the American Pain Society, 1995.

Meleka, S., Pappagallo, M., Raja, S.N., Campbell, J.N. Evaluation of the role of alpha-adrenoceptor mechanisms in postherpetic pain. Sixteenth Annual Meeting of the American Pain Society, 1995.

Raja, S.N., Dougherty, P., Fields, H., Gordh, T. Pain therapies based on mechanisms of hyperalgesia and antinociception. Sixteenth Annual Meeting of the American Pain Society, 1995.

Ali, Z., Ringkamp, M., Meyer, R.A., Raja, S.N. Plasma extravasation is reduced on the plantar surface of the rat hind paw following ligation of the L5 and L6 spinal nerves. Society for Neuroscience Abstract, 1995.

Larson S.I., Roark, G.L., Raja, S.N., Portilla, J.S., Rothman, R.B., Harris, A.P. Anti-opioid peptide levels in the cerebrospinal fluid of pregnant versus non-pregnant women. Society for Obstetric Anesthesia Practice, 1996.

Wesselmann, U., Ali, Z., Meyer, R.A., Raja, S.N. Topical clonidine attenuates ongoing pain and hyperalgesia in patients with sympathetically maintained pain (SMP). Society for Neuroscience Abstract, 1996.

Raja, S.N., Kiri, N., Pappagallo, M., Clark, M., Haythornthwaite, J. Assessment of drug effects on pain and hyperalgesia in postherpetic neuralgia. Association of University Anesthesiologists Satellite Symposium on Outcomes Research, 1996.

Raja, SN, Ali, ZA, Wesselmann U, Meyer RA. Intradermal injections of adrenergic agonists produces pain in patients with sympathetically maintained pain. 8<sup>th</sup> International Catecholamine Symposium, Pacific Grove, CA, 1996.

Kiri N, Raja SN, Pappagallo M, Clark MR, Haythornthwaite JA. Differential somatosensory changes in postherpetic neuralgia, 8<sup>th</sup> World Congress on Pain, Vancouver, BC, Canada, A174, p. 270, 1996.

Shir Y, Ratner A, Raja SN, Campbell JN, Seltzer Z. The effect of diet on neuropathic pain following partial nerve injury in rat, 8<sup>th</sup> World Congress on Pain, Vancouver, BC, Canada, A76, p. 352, 1996.

Meyer RA, Raja SN. Intradermal norepinephrine produces a dose dependent hyperalgesia to heat in humans. 8<sup>th</sup> World Congress on Pain, Vancouver, BC, Canada, A232, p. 398, 1996.

Haythornthwaite, JA, Shir, Y, Raja SN, Frank SR. Chronic pain following radical prostatectomy. 8<sup>th</sup> World Congress on Pain, Vancouver, BC, Canada, 1996.

Raja, SN, Oaklander AL, Pappagallo M, Clark MR, Haythornthwaite JA, Quatrano-Piacentini, AL. Differential alterations in mechanical and thermal sensations in postherpetic neuralgia. Presented at the 3<sup>rd</sup> International Conference on the Varicella-Zoster Virus, Palm Beach, FL, 1997.

Fuchs, PN, Roza C, Sora I, Uhl G, Raja SN. Morphine fails to alter paw withdrawal thresholds to mechanical stimuli in  $\mu$ -opiate receptor knockout mice. 16<sup>th</sup> Annual Scientific Meeting of the American Pain Society, New Orleans, October 1997

Frank S.M., Raja, S.N., Bulcao, C., Kelly, S. Relative contribution of core and skin-surface temperatures to physiological responses and subjective thermal sensation in human subjects. Annual meeting of the American Society of Anesthesiologists, San Diego, 1997.

Raja, S.N., Ali, Z., Wessermann, U. Cutaneous injections of  $\alpha$ -adrenergic agonists induces pain in patients with sympathetically maintained pain. Annual meeting of the American Society of Anesthesiologists, San Diego, 1997.

Fuchs PN, Ringkamp M, Raja SN. Surgical sympathectomy decreases formalin-induced pain but does not alter paw-withdrawal thresholds to mechanical stimuli in rats. Society for Neuroscience Meeting, New Orleans, A917.10, 1997.

Kazim DA, Staats PS, Raja SN. Analgesic efficacy of lidocaine and morphine infusions in postamputation pain. 17<sup>th</sup> Annual Meeting of the American Pain Society, San Diego, 1998

Fuchs PN, Roza C, Sora I, Ujike H, Uhl G, Raja SN: Differential effects of  $\mu$ -,  $\delta$ - and  $\kappa$ -opioid receptor agonists on the response to mechanical stimuli in  $\mu$ -opioid receptor knockout mice. Society for Neuroscience Abstract, Los Angeles, A352.2, 1998.

Raja SN, Fuchs PN, Meyer RA: Heat hyperalgesia in humans following intradermal injections of  $\alpha_1$  and  $\alpha_2$  agonists. Society for Neuroscience Abstract, Los Angeles, A641.17, 1998.

Shiotani M, Fuchs PN, Ringkamp M, Mansikka H, Brimijoin S, Hammond P, Raja SN: Preganglionic immunosympathectomy decreases formalin-induced pain but does not alter mechanical paw-withdrawal thresholds in rats. Society for Neuroscience Abstract, Los Angeles, A831.3, 1998.

Frank SM, Raja SN, Bulcao C, Goldstein D: Determinants of thermal discomfort and the thermoregulatory response: Relative contribution of core and skin-surface temperatures. Anesthesiology V89, A312, 1998.

Raja SN, Abatzis V, Frank SM: Role of  $\alpha$ -adrenoceptors in neuroma pain in amputees. Anesthesiology V89, A1083, 1998.

Haythornthwaite JA, Clark MR, Raja SN, Quatrano-Piacentini A, Pappagallo M: Pain coping strategies predict adjustment to post-herpetic neuralgia. American Pain Society, San Diego, 1998.

Haythornthwaite JA, Raja SN, Clark MR, Quatrano-Piacentini A, Pappagallo M: Long-acting opioid treatment and cognitive function in elderly patients with post-herpetic neuralgia. American Pain Society, San Diego, 1998.

Tran KM, Raja SN, Frank SM, El-Rahmany HK, Kim LJ: Effects of iohexol on the efficacy of lumbar sympathetic blockade for treatment of pain: Randomized trial. American Soc. Anesthesiologists, Dallas, TX, 1999.

Raja SN, Mansikka HT, Sheth R, Winchurch R: Nerve injury-induced mechanical, but not thermal, hyperalgesia is attenuated in neurokinin-1 receptor knockout mice. American Soc. Anesthesiologists, Dallas, TX, 1999.

Mansikka H, Sheth R, Winchurch R, Raja SN: Mechanical, but not thermal, hyperalgesia after nerve injury is attenuated in neurokinin-1 receptor knockout mice. Society for Neuroscience, Miami, 1999.

Weng H-R, Mansikka H, Winchurch R, Raja SN, Dougherty PM: Attenuation of “wind up” of dorsal horn nociceptive neurons in NK-1 receptor knockout mice. Society for Neuroscience, Miami, 1999.

Raja SN, Vaslav R, Heinberg L, Dooley W: Comparison of phantom sensations and pain after mastectomy with or without breast reconstruction. American Soc. Anesthesiologists, San Francisco, 2000.



Raja SN (moderator), Cohen LG, Katz J, Lenz FA: Phantom pain after amputations: A perceptual correlate of thalamic and cortical reorganization. Symposium at Annual Mtg of American Pain Society, Atlanta, 2000.

Raja SN, Vaslav R, Heinberg L, Dooley W: Phantom sensations and pain after mastectomy with or without reconstructive surgery. Annual Mtg of American Pain Society, Atlanta, 2000.

Vaslav R, Staats P, Kazim DA, Wu C, Raja SN: Analgesic effects of intravenous lidocaine and morphine on post-amputation pain: A double blind cross-over trial. Annual Mtg of American Pain Society, Atlanta, 2000.

O’Gorman D, Elrahmany HK, Walia KS, Campbell JN, Raja SN: Contralateral lumbar sympathetic innervation: A potential cause for failure of unilateral surgical sympathectomy in sympathetically maintained pain. Annual Mtg of American Pain Society, Atlanta, 2000.

Raja SN, Mansikka H, Sheth RN, Sora I, Uhl G: Enhancement of mechanical hyperalgesia after nerve injury in the mu-opioid receptor knockout mice. Society for Neuroscience, New Orleans, 2000.

Mansikka H, Zhou L, Donovan DM, Pertovaara A, Raja SN: Alpha-2 adrenoceptor mediated antihyperalgesia is attenuated in the mu-opioid receptor knockout mice. Society for Neuroscience, New Orleans, 2000.

Sheth RN, Mansikka H, Ringkamp M, Meyer RA, Raja SN: NT-3+/- mice exhibit blunted responses to nociceptive stimuli but still develop hyperalgesia after nerve injury. Society for Neuroscience, New Orleans, 2000.

Shir Y, Anderson WS, Sheth RN, Raja SN, Belzberg AJ, Campbell JN: Soy enriched diets do not suppress hyperalgesia associated with inflammation in rats. Society for Neuroscience, New Orleans, 2000.

Raja SN, Haythornthwaite JA, Trivison TG, Pappagallo M, Clark MR, Max MB: Differential analgesic effects of opioids and tricyclic antidepressants in subgroups of patients with postherpetic neuralgia. American Pain Society, Phoenix, 2001.

Raja S, Haythornthwaite J, Trivison T, Pappagallo M, Clark M, Max, M: Opioids and tricyclic antidepressants have differential analgesic effects in subgroups of patients with

postherpetic neuralgia. Association of University Anesthesiologists, Rochester, N.Y., 2001.

Wu CL, Staats PS, Tella PK, Vaslav R, Raja SN: Analgesic effects of intravenous lidocaine and morphine on post-amputation pain: A randomized double-blind, active-placebo-controlled crossover trial. American Soc. Anesthesiologists, New Orleans, 2001.

Mansikka H, Zhao C, Sheth RN, Uhl GR, Raja SN: Mu-opioid receptors exert a tonic inhibitory effect on nerve injury-induced mechanical but not thermal hyperalgesia. American Soc. Anesthesiologists, New Orleans, 2001.

Ringkamp M, Zhao CS, Meyer RA, Raja SN: Capsaicin treatment of sciatic and saphenous nerves does not abolish spinal nerve-induced mechanical hyperalgesia. Society for Neuroscience, San Diego, 2001.

Zhao CS, Wacnik PW, Meyer RA, Wilcox GL, Raja SN: Analgesic effects of soy diet on different pain models in mice. Society for Neuroscience, San Diego, 2001.

Tall J, Meyer RA, Raja SN: Complete Freund's adjuvant induced edema and thermal hyperalgesia is suppressed by dietary soy in rats. American Pain Society, Baltimore, 2002.

Zhao CS, Raja SN: Role of  $\mu$ -Opioid Receptors in the Formalin-Induced Pain Behavior in Rats. Association of University Anesthesiologists, Nashville, 2002.

Tall JM, Seeram NP, Nair MG, Meyer RA, Raja SN: Carrageenan-induced edema and hyperalgesia is suppressed by oral administration of tart cherry extract in the rat. Society for Neuroscience, Orlando, 2002.

Ringkamp M, Zhao CS, Hartke TH, Meyer RA, Raja, SN: Capsaicin treatment of sciatic and saphenous nerves does not abolish mechanical hyperalgesia after spared nerve injury. Society for Neuroscience, Orlando, 2002.

Zhao CS, Tao YX, Tao F, Levine FC, Meyer RA, Raja SN: Role of  $\mu$ -opioid receptors in the nociceptive response induced by subcutaneous formalin. Society for Neuroscience, Orlando, 2002.

Pogatzki EM, Raja SN: Characterization of primary hyperalgesia after plantar incision in mice. Society for Neuroscience, Orlando, 2002.

Tao YX, Rumbaugh G, Wang GD, Zhao C, Kauer F, Zhuo M, Raja SN, Huganir RL, Bredt DS, Johns RA: Impaired persistent pain and NMDA receptor function in mice lacking PSD-93. Society for Neuroscience, Orlando, 2002.

Raja SN, Haythornthwaite JA, Max MB, Tella PK: Sub-groups of postherpetic neuralgia patients respond differently to opioid and tricyclic antidepressants. 22<sup>nd</sup> Annual American Pain Society Meeting, Chicago, 2003.

Zhao CS, Tall JM, Meyer RA, Raja SN: Anti-allodynic effects of systemic and intrathecal morphine in the two models of neuropathic pain in rats. Society for Neuroscience, New Orleans, 2003.

Zhao CS, Tall JM, Meyer RA, Raja SN: Anti-allodynic effects of systemic and intrathecal morphine in the spared nerve injury model of neuropathic pain in rats. American Soc. Anesthesiologists, San Francisco, 2003.

Kudel IC, Edwards R, Heinberg L, Haythornthwaite JA, Raja SN,: The effects of perceived partner-related social support on health-related quality of life in women post-mastectomy. 25<sup>th</sup> Annual Society of Behavioral Medicine Meeting and Scientific Sessions, Baltimore, 2004.

Agarwal S, Block BM, Haythornthwaite JA, Raja SN: Transdermal fentanyl is effective in reducing neuropathic pain. 2<sup>nd</sup> Joint Scientific Meeting of American Pain Society and Canadian Pain Society, Vancouver, 2004.

Agarwal S, Tella P, Haythornthwaite JA, Raja SN: Opioids but not mexiletine, alleviate post-amputation pain: a randomized, placebo-controlled, crossover trial. American Society of Anesthesiologists, Las Vegas, 2004.

Razdan N, Agarwal S, Tella P, Raja SN: Do the characteristics of ongoing and evoked postamputation pain and changes in mood, cognition, and physical function differ based on the etiology for amputation? American Soc. of Regional Anesthesia, Phoenix, 2004.